Terms of Reference impact evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation in Indonesia

Version 09 February, 2011

1 PURPOSE, RATIONALE AND SCOPE OF THE EVALUATION

The world today is confronted with interrelated challenges concerning poverty reduction, climate and energy. Access to energy, and increasingly *renewable* energy, is internationally considered a fundamental issue in poverty reduction, as expressed in –amongst others- the United Nations, G8 meetings and climate negotiations.[1] It is considered one of the prerequisites for achieving the Millennium Development Goals (MDGs).

The Netherlands' energy programme, launched in the early 1990s, provides both incentives to establish an enabling environment for access to energy and to activities that facilitate access to energy for the poor in developing countries. Over time, the focus of the energy and development policy, both in the Netherlands and internationally, shifted from an output-orientation with different technical options to a *renewable* energy perspective.[2] In 2004, the minister for development cooperation of the Netherlands formulated an output target of 10 million people being supplied with access to energy by 2015 as part of the Dutch action plan towards the MDGs. The current policy on environment and renewable energy of the Netherlands' Ministry of Foreign Affairs (July 2008) announced an extra input of € 500 million for renewable energy in developing countries through the "Promoting Renewable Energy Programme" (PREP)[3]. The ultimate goal of this investment is to contribute to poverty reduction, gender equality and a reduction of the negative effects of the use of energy on the climate.[4] The PREP started in 2008 and supports four - interlinked - activities:

1. Investing directly in the production of and access to renewable energy in priority countries and regions;
2. Improving the sustainability of production of biomass for energy purposes;
3. Influencing policy of partners responsible for investment in renewable energy;
4. Developing capacity and knowledge in developing countries with regards to renewable energy.

PREP is a *container structure* for an array of sub-funds, programmes, projects and activities. The majority of these sub-funds and programmes has been either made available to special regional (or global) funds, delegated or outsourced to third parties for either administration or implementation (or both). It also encompasses energy-related Public Private Partnerships and projects by non-governmental organizations (NGOs). By 2009, PREP funded activities in 33 countries, of which 18 in Africa, 8 in Asia and 7 in Latin America (the number of countries

[1] For example, the Kyoto Protocol (United Nations 1997) and the World Summit on Sustainable Development (WSSD, United Nations 2002).
[2] Dankers and Rijs (2007), Evaluatieve inventarisatie Energie en Ontwikkeling, in opdracht van BZ, DGIS november 2007.
[3] Of this allocation € 375 million can be considered as 'additional' resources.
[4] Ministry of Foreign Affairs, DMW (2008), Beleidsnotitie milieu en hernieuwbare energie in ontwikkelingssamenwerking:The Hague, July 2008, p.10.

may alter over the implementation period, but will not increase significantly). Not all activities are necessarily restricted to the administrative boundaries of a country.

By September 2009, the Policy and Operations Evaluation Department (IOB) of the Netherlands Ministry of Foreign Affairs had determined a framework Terms of Reference (ToR) for the evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation. This is an overarching framework for a series of impact evaluations of renewable energy and development programmes supported by the Netherlands, with a focus on the medium and long term effects of these programmes on end-users or final beneficiaries. Forced by severe budget restrictions as imposed early 2011, this framework ToR had to be amended.

A characteristic of the envisaged studies is the use of quantitative research techniques, in combination with qualitative techniques, to get insight in the magnitude of effects. The purpose of the impact evaluations is to account for assistance provided and to create the possibility to draw lessons from the findings for improvement of policy and policy implementation. The results of these evaluations will be input to a policy evaluation of the "Promoting Renewable Energy Programme" (PREP) to be concluded in 2014[5].

1.1 CENTRAL EVALUATION QUESTION

> The central research question for the impact evaluations is[6]: "*What have been the effects – positive or negative, intended or not – on living conditions of target groups of the energy and development cooperation programmes and projects supported by the Netherlands and how sustainable are the results achieved*"?

'Access to energy' is defined from a demand perspective to include energy services that improve living conditions (e.g. electricity for lighting and fuel for cooking) and enable social services and economic production (e.g. cooling of medicines, communication, and manufacturing).[7]

The evaluations will focus on different types of direct investments in production and improved access to energy, amongst them *biogas, electrification, solar lanterns and efficient cooking stoves*. The unit of analysis includes affected individuals (m/f), households[8], public facilities and small enterprises. The impact on macro variables, such as the climate, is not subject to own research but will be covered, if and where possible, in the descriptive part of the programme evaluations.

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[5] Initially 2013, but due to budget restrictions postponed to 2014.

6 Reference Framework Terms of Reference impact evaluation of Energy and Development Cooperation supported by the Netherlands, Sept 2009.

7 Chapter 1.1. access to Energy. W.J.Cornelissen. SEOR (2008), Accountable in Silence. Evaluation Dutch/German Partnership Energising Development' report to Environment and Water Department (DMW), Ministry of Foreign Affairs, the Netherlands.

8 The concept "household" is not internationally uniform. The concept should be made operational for Indonesia on the basis of documentation, standards used by the National Bureau for Statistics and experts' opinions.

For the series of impact evaluations four[9] countries with a concentration of Netherlands supported activities have been selected, notably Burkina Faso, Rwanda, Indonesia and Senegal. The selection criteria used were (i) the priority of the region / country in the PREP programme, (ii) the concentration of Netherlands supported activities; (iii) the coverage of the main types of intervention and (iv) the implementation through a mix of partners.[10] The present terms of reference is restricted to the evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation in **Indonesia**.

2 ENERGY INTERVENTIONS IN INDONESIA

2.1 ENERGY CONTEXT

Indonesia is a country well endowed with energy resources. Not only does the country have access to oil fields and coal mines, the opportunities for geothermal development, hydro power and bio fuel production are also plentiful. However, access to energy is not self-evident in Indonesia. Although the majority of the population does have access to electrification, great disparity exists between and within the different islands. In 2007 the electrification ratio was 64%, still leaving an estimated 70 million Indonesians without access to electricity. The aims are high though, with the Government of Indonesia (GoI) foreseeing a national target of 95% of all households electrified by 2025.[11] The archipelagic nature of the country makes this target ambitious, but it also increases the scope for the role of renewable energy sources, such as electricity generation from micro-hydro plants or the use of bio fuels.

In its transition from a lower income to a middle income country, Indonesia faces the challenge of rapidly scaling up its energy sector. This does not only assume further exploiting its fossil fuel resources but also looking at ways in which energy needs in the future can be fulfilled in a sustainable way. Although currently the energy mix is dominated by oil (52% in 2008) and gas (29% in 2008), the shift towards an energy mix encompassing a larger amount of energy from renewable sources is foreseen.[12] The Presidential Decree No.5 of 2006 and the Blueprint of National Energy Management 2005-2025 set out the energy policy targets. The objectives for 2025 concern a share of renewable energy in the energy mix of 15% or higher[13], expressed in the following manner:

- Oil becomes less than 20%;
- Gas becomes less than 30%;
- Coal becomes less than 33%**;**

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[9] Up to January 2011, Ethiopia was also selected, but budget constraints urged for a reduction. Although Senegal has been maintained as one of the countries for impact assessment, the evaluation programme is without funding at least for the year 2011.

10 Framework terms of Reference Impact evaluation of Energy and Development Cooperation supported by the Netherlands. Section 5. September 2009. In January 2011 the selection criteria used for the reduction of the envisaged evaluation were: (i) Implementation Agreements already signed (ii) likelyhood that countries will remain on the list of partner countries of the Netherlands' development assistance (iii) costs of the envisaged studies per country.

11 D.Kusdiana, A. Saptono: Implementation of rural energy by renewable energy in Indonesia, Workshop on Rural Energization. MEMR, 2008.

12 OECD/IA (2008), Energy Policy Review of Indonesia, Paris: International Energy Agency

13 This target has since been increased to a target of a share of 25% of renewable energy in the energy mix by 2025 (Interviews with MEMR, 29 September & 6 October 2010)

- Bio fuel becomes more than 5%;
- Geothermal becomes more than 5%;
- Liquefied coal becomes more than 2%.
- Other new energy and renewable energy, particularly biomass, nuclear, hydropower, solar power, and wind power becomes more than 5%;

Several other important laws relating to energy are the Energy Law No.30/2007 drawing further attention to new renewable energy development and calling for the creation of specific incentives by government and local governments, the Electricity Law No.30/2009 which prioritizes the use of renewable energy as a primary energy source and the Law 27/2003 on the development of geothermal energy resources. These laws however only provide brief guidelines and the actual implementation which is done according to 'operating regulation', which are further developed in the subsequent years.[14] A new comprehensive renewable energy policy is being drafted (2010).[15]

Within the new renewable energy programme of the Ministry of Energy and Mineral Resources (MEMR) four broad technologies can be distinguished: geothermal, bio-energy (which also includes biogas), micro-hydro power and solar. Geothermal offers the greatest potential for scaling up the use of renewable energy and is therefore also considered as one of the main priorities for the GoI.[16] Several donors, including the World Bank and the IFC have developed programmes which are geared towards the development of the geothermal sector. These programmes involve both capacity building at the side of Pertamina Geothermal (the geothermal branch of the state-owned Oil and Gas Company) as well as capacity building at the side of the GoI. An important element in furthering the development of these resources is engaging the private sector. This involves providing incentives for private sector participation. One of the incentives provided to pursue this goal has been the establishment of regulations enabling small and medium size enterprises using renewable energy to sell their power production of surplus power to the grid. For medium-scale enterprises power-purchase agreements of 10 years or longer can be negotiated.[17] However, the set feed-in tariffs, especially for the tariffs for geothermal energy are generally considered to be too low.[18]

Following from the Energy Law 2007, local governments are required to formulate their own regional energy strategy aimed at securing sustainable energy supplies and promoting energy conservation and the use of renewable energy. The development of renewable energy projects in the regions is therefore often initiated by a local government together with other local stakeholders.[19]

A key obstacle in successfully promoting the use of renewable energy is the difficulty of these energy resources to compete with fuel (kerosene, diesel, gasoline and –to a lesser extent-LPG) and electricity prices, which are heavily subsidized by government. Not only does this subsidization lead to an immense pressure on the national budget, the subsidization does not benefit the poorest households in the first place, although efforts have been made to gear the subsidies more towards the poor. In response to both national as well as international critiques

14 OECD/IA (2008), Energy Policy Review of Indonesia, Paris: International Energy Agency
15 Interview Luluk Suniarso, MEMR, 6 October 2010.
16 Interview MEMR, 7 Octobre 2010.
17 OECD/IA (2008), Energy Policy Review of Indonesia, Paris: International Energy Agency
18 Interview MKI, 28 September 2010.
19 OECD/IA (2008), Energy Policy Review of Indonesia, Paris: International Energy Agency

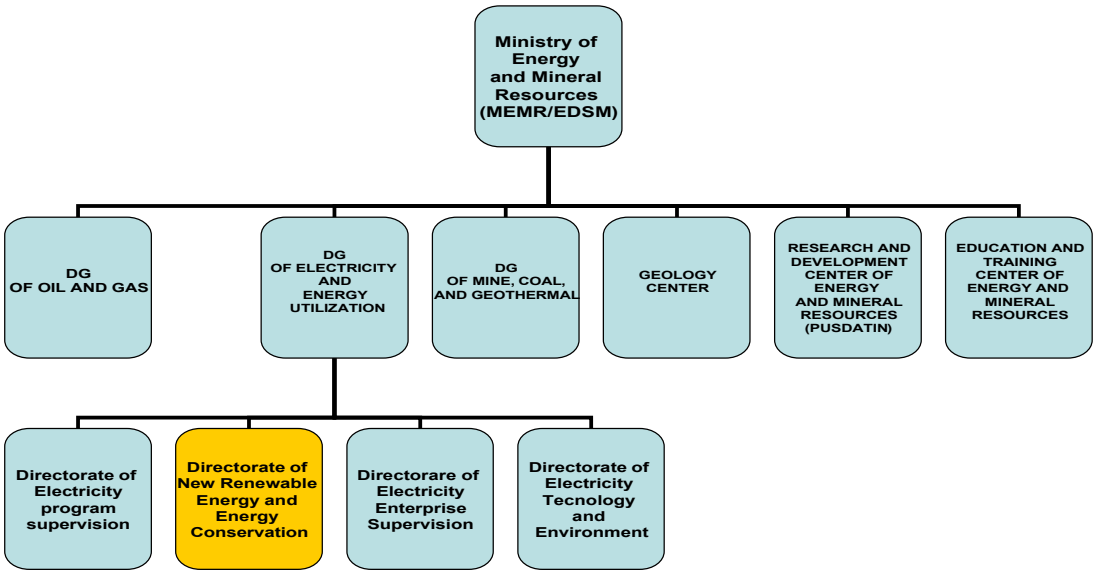
on the energy subsidies, the GoI has announced full elimination of the fossil fuel subsidies by 2014 as well as a reduction of total energy subsidies by 10%-15% per year during the period 2011-1014.[20] However, the political implications of the full elimination of the energy subsidies will most likely make the implementation of these measures a lengthy process. In order to increase the competitiveness of renewable energy sources, the GoI has introduced by ministerial decree a 5% tax cut over six years for renewable energy producers (geothermal, solar and bio fuels) as well as exemptions from value-added tax and import duties on equipment. Another provision allows investors to use accelerated depreciation and amortization on assets to reduce taxable income. When these changes will actually be implemented though, remains unclear.[21]

Key in the renewable energy sector is the Ministry of Energy and Mineral Resources, and in particular the newly established Directorate of New Renewable Energy and Energy Conservation, falling under the DG of Electricity and Energy Utilization (see figure 1). The development of geothermal energy as a renewable energy source falls under the responsibility of the DG of Minerals, Coal and Geothermal. Another important body under the MEMR is the Centre for Data and Information on Energy and Mineral Resources (PUSDATIN), which is responsible for the information technology needs of MEMR. The Ministry of Home Affairs is involved in renewable energy as far as it concerns energy programmes which are implemented under the community development (PNPM) programme, such as the World Bank managed micro hydro pilot programme (see for more information below). MoHA will count on the expertise of MEMR with regards to energy but implementation arrangements at a local level are the responsibility of MoHa. Two large state-owned companies dominate the energy sector in Indonesia: PT PLN being the electricity company charged with generation, transmission and distribution of electric power and Pertamina being the national Oil and Gas Company.

Established by the Energy Law 2007, the National Energy Council (*Dewan Energi Nasional*) was created as an independent body mandated to design and formulate national energy policies, determine a master plan on national energy and responses to energy crisis and emergency conditions and monitor the implementation of cross-sectoral policies on energy.[22]

20 Mourougane, A. (2010), "Phasing Out Energy Subsidies in Indonesia", OECD Economics Department Working Papers, No. 808, OECD Publishing.
21 Faisal Maliki Baskoro, Jakarta Globe, 16 May 2010. http://www.thejakartaglobe.com/business/renewable-energy-producers-to-get-tax-breaks/375280. Situation as per 2010.
22 OECD/IA (2008), Energy Policy Review of Indonesia, Paris: International Energy Agency, p. 36; Mourougane, A. (2010), "Phasing Out Energy Subsidies in Indonesia", OECD Economics Department Working Papers, No. 808, OECD Publishing, p. 20.

Figure 1: Overview of organisational structure Ministry of Energy and Mineral Resources (MEMR)



Source: Own illustration

2.2 PREP FUNDED PROGRAMMES AND ACTIVITIES IN INDONESIA

A preparatory mission to Indonesia[23] elaborated the inventory of the energy activities funded directly or indirectly with PREP resources. The main aim of the preparatory mission was to consult and coordinate with the authorities of the Government of Indonesia, the Embassy of the Kingdom of the Netherlands in Jakarta and the main implementing agencies of energy activities on the proposed impact evaluation and to obtain an understanding of the main problems related to energy supply, access and use in the country and to what extent the (in part) Netherlands' funded programmes and projects address these problems.

By September 2010, 9 different programmes and projects in the area of renewable energy in Indonesia funded by PREP were identified. These are:

- Indonesia Geothermal Power Preparation Grant (Pertamina) (World Bank);
- Indonesia Geothermal capacity building (Ministry of Energy and Natural Resources)(World Bank/GEF, funded through ASTAE);
- Indonesia Domestic Biogas Programme, BIRU (HIVOS – SNV);
- The multi-donor trust fund (administered by the World Bank) for micro-hydro energy within the National Programme for Community Development (PNPM), supported by the Micro Hydro Power Technical Support Unit (MHP TSU) as component of the Energising Development programme EnDev (GIZ);

23 A preparatory mission visited Indonesia between 28 September and 8 October 2010. The team comprised the following members: Willem Cornelissen (team leader IOB); Ms. Jolijn Engelbertink (IOB); Dr. Jörg Peters (RWI) and Dr. Robert Sparrow (ISS).

- Capacity Development and Strengthening for Energy Policy Formulation and Implementation of Sustainable Energy Projects in Indonesia – CASINDO (Ministry of Energy and Mineral Resources and 12 European and Indonesian research organisations);
- Programme contracted out by the Netherlands Embassy in Jakarta to Agency NL, concerning activities related to geothermal capacity building, energy efficiency and private sector promotion.
- IFC Indonesia Renewable Energy Programme Development (IFC);
- Sustainable Biomass programme (Embassy Kingdom of the Netherlands in Jakarta and Ministry of Energy and Natural Resources)
- Palm oil certification (CREM).

In addition 9 different projects were identified that have received funding through the Global Sustainable Biomass Fund. In this evaluation "access to energy" is understood as "access to energy at the local level". Only two out of these 9 projects have the potential to contribute to energy supply for domestic use in the same area. These two have been selected for descriptive analysis and evaluation:

- Sustainable Candlenut and Castor Biomass Supply Chains in Lombok Island (Fauna and Flora International), and
- Sugar palms for sustainable biomass production (SPIE Controlec Engineering BV).

A table containing brief descriptions of the different programmes and the amount of Dutch funding involved is included in Annex 1.

Above mentioned programmes and activities will be subject to descriptive evaluation, but –in accordance to the framework ToR of September 2009- out of these 11, two specific programmes were selected for rigorous impact analysis[24]:

(a) the multi-donor Trust Fund financed and GIZ- EnDev assisted programme for micro hydro energy generation,
(b) the Indonesia Domestic Biomass Programme (HIVOS - SNV). Decisive in this regard has been the feasibility to undertake an evaluation using quantitative methods as well as the added value of looking at these technologies in the context of technologies selected in the other countries included in the overall evaluation.

Decisive in this selection has been the added value of looking at these technologies in relation to other technologies selected for impact analysis in the other countries that form part of the

[24] In October 2010, the selection was made based on the following pre-determined criteria:

(i) the policy relevance of the activity to Indonesia;
(ii) the relative importance of the same type of intervention in either Burkina Faso, Senegal, Rwanda or Ethiopia;
(iii) the number and relative concentration of the installations and/or beneficiaries (including the geographical distribution over rural and urban areas);
(iv) the existing and planned activities concerning a particular form of energy;
(v) the mix of actors;
(vi) the feasibility to apply quantitative impact methods.

The bulk of the activities are more related to the creation of an 'enabling environment' instead of providing direct energy access to communities and households. These type of 'upstream' activities are also less suitable for applying quantitative techniques.

Early 2011, the selection was reviewed based on considerations of financial affordability only.

overall evaluation. An other criterium has been the (financial) feasibility to undertake a rigourous impact evaluation.

Being aware that geothermal energy generation is government's highest priority in the energy sector, the results of activities related to geothermal energy, being the Indonesia Geothermal Power Preparation Grant; the Indonesia Geothermal Capacity building; and the IFC Indonesia Renewable Energy Programme Development will also be evaluated (in-country) making use of qualitative techniques only.

2.3 PROGRAMMES AND PROJECTS IN INDONESIA SELECTED FOR IN-DEPTH EVALUATION

2.3.1 INDONESIA DOMESTIC BIOGAS PROGRAMME (BIRU)

The biogas programme (*Program Biogas Rumah*) BIRU is implemented by the Dutch organisation HIVOS and technically seconded by SNV. It has started its activities in 2009. By the end of 2012, it is envisaged to have disseminated some 8,000 biogas digesters (see Table 1). Although the programme has counted with a slow start, initially failing to achieve the targets for 2009, the production has picked up momentum. By early September 2010 already 600 digesters were installed with almost 200 having been built in August alone. Tentative figures for September and October indicate that the target for 2010 can be achieved.

Table 1: Target figures for biogas digesters to be disseminated

Description	2009	2010	2011	2012	Total
Number of sold digesters	150	1,150	2,600	4,100	8,000

After completion of feasibility studies in several districts, three districts were selected in May 2009: Bandung (Western Java), Yogyakarta (Central Java) and Malang (Eastern Java). The dissemination of digesters is ongoing in these districts and digesters are installed on a regular basis, although with regional differences. The Eastern Java area has been outperforming the other districts by far, not at least thanks to a fruitful collaboration with the international company Nestlé. This Swiss company promotes actively the biogas concept in its effort to avoid "bad headlines" about water pollution by milk cow excrements going into surface waters. Therefore, BIRU considers making further use of the partnership with Nestlé and disseminating most of the 8,000 digesters in the Eastern Java district. This would imply a regional re-planning of the programme. In addition to the areas mentioned above, the opportunities of expansion to other districts are in Lombok, Bali, South Sulawesi, and Sumatra. These are currently (2010) being studied by BIRU.

Up to 2010, the programme focuses on dairy farmers, since a certain number of cows in a stable is required to produce sufficient volume for economic transformation into biogas. Dairy cooperatives are a pivotal partner to BIRU in disseminating the biogas concept among dairy farmers. Traditionally, milk production has never been a prominent business in Indonesia.

Yet, along with the substantial economic growth in the recent decades more and more multinational corporations have started to produce locally powdered milk and other dairy products. While in the first years milk powder was imported from Australia and Europe, the turn is towards local supply of milk by dairy farmers organised in cooperatives.

The BIRU partner cooperatives count between 5,000 and 7,000 members and raise awareness about the BIRU biogas digesters. If any member shows interest, the cooperative carries out a check on the eligibility of the household, based on criteria like having at least two cows and a positive cash flow from the milk revenues supplied to the cooperative. In addition, the cooperative verifies if the household's plot is large enough to install a digester. If the farmer qualifies, construction can start if and when masons are available (usually within a few weeks time). After the digester has been installed, the mason fills a completion report, which is submitted to BIRU. BIRU's quality assurance agent in the respective district controls the quality of the work delivered.

The total investment costs per digester may amount to € 550-600, of which the programme subsidizes € 160. The remaining € 450 is paid for by the farmer, usually by a credit obtained through the credit schemes of the cooperative. The instalments are financed by deductions from the payment the farmer receives for the delivery of milk (hence in fact an in-kind instalment) at an interest rate payment of 8-16%. Different partners like Nestlé or Rabobank made resources available for these credit schemes. Repayment behaviour is reported to be very good, but depends on the customer's satisfaction with the digester (and, hence, on the quality of the installation delivered).

The masons are trained by BIRU. By October 2010, around 200 masons had been trained. The intention is that the training will be taken over by local institutions, such as technical and vocational schools. BIRU strives to include biogas digester-technology into the curricula of these schools. The purpose is to not only build up demand for biogas, but also to ensure the supply of properly installed digesters and their maintenance.

2.3.2 MICRO-HYDRO POWER (WB FINANCED AND GIZ-SUPPORTED)

The National Programme for Community Empowerment (*Program Nasional Pemberdayaan Masyarakat - PNPM*) is a programme for (urban and rural) community development that reaches about 30,000 villages and cities nationwide. It is the largest programme of its kind in the world. The PNPM provides funding and technical support for community driven projects in various sectors. Since the demand driven approach generated only a few environmental and natural resource management projects (within the Rural PNPM), the donor community, (and in particular Canada) established a separate financing line aimed at triggering the demand for natural resource management. This financing line is called the Green PNPM. Funds are made available through a multi donor Trust Fund deposited to and managed by the World Bank. The Netherlands participate in that Trust Fund and has earmarked its finance especially for activities concerning micro hydro power. In 2009 the Green PNPM Micro Hydro Power pilot programme (*MHP pilot* in the following) started in 8 provinces, equally spread over the islands of Sulawesi and Sumatra. About half of the Green PNPM funding is allocated to the funding of micro-hydro power plants of the pilot scheme. The funds are made available for the hardware mainly.

The main objective of the MHP pilot is to support and expand sustainable access to energy through micro-hydro power generation in rural areas, with the aim of improving living conditions of households (in particular those pertaining to the lowest income brackets), increasing productive potential and income, eventually leading to poverty reduction. In addition, rural electrification through micro-hydro power plants is expected to have beneficial health and environmental effects.

The MHP pilot builds on experiences from the Energizing Development (EnDev) 1 programme, implemented by GIZ (with Dutch-BMZ core funding[25]) from 2006-2009 and aimed at scaling up the construction and operation of micro-hydro schemes in Indonesia. By late 2010, about 90 EnDev 1 micro-hydro plants were operative. In 2009, GIZ Indonesia started activities funded by a second phase of the EnDev programme. Under EnDev2, the GIZ support in Indonesia shifted focus to facilitating and supporting the community driven approach under the Green PNPM. The target set for 2013 is to have 300 micro-hydro power plants installed.

In sum, the PREP supports the *MHP pilot* in two ways[26]:

1. The funding earmarked to micro hydro energy within the Green PNPM multi donor trust fund managed by the World Bank. The donors are Australia, Canada, Denmark and the Netherlands.
2. The BMZ-Dutch partnership EnDev 2 programme, implemented by GIZ, offers technical support and capacity development to the MHP pilot:
   - Technical support is provided by the MHP Technical Support Unit (TSU);
   - Capacity development at national level is supported through the Micro Hydro Power Project (MHPP^2), focussing on establishing the sustainability of the sector.

The process of the community driven approach is that villages (or sections thereof) submit proposals for funding small infrastructure at local level. The technical community workers of the PNPM Rural assist in the formulation of the proposals and in the selection process. In principle, the PNPM design implies competition for block grants, based on the quality of proposals and prioritization between and within villages. In the case a community gives priority to the demand for a micro hydro plant, the GIZ TSU staff supports the local government in the assessment of the application by conducting site verification and realising feasibility studies. In the case the application leads to a technically and economically feasible proposal, the corresponding village is awarded a block grant (through government, but originating from the PNPM Green component earmarked for micro hydro energy) for the construction of a micro-hydro power plant. The MHP pilot grants are on top of the regular PNPM (rural) grants, and amount on average to USD 50,000 per scheme. Unlike the regular PNPM projects, there is no formal budget ceiling. Subsequently, the village makes manual labour and local material available and contracts a company to install the micro hydro plant. The quality control and quantity surveillance is done by the TSU. In 2010, 80 villages have been selected in Sulawesi and Sumatra.

25 The GIZ EnDev1 project was part of the Dutch-German energy partnership Energizing Development (EnDev). EnDev is an output oriented program that aims at providing modern energy to 6.1 million persons in 21 countries. In its second phase, EnDev provides technical advise to micro-hydro activities in Indonesia, in particular the Green PNPM projects.

26 During the preparatory mission in October 2010, some stakeholders argued that –indirectly- also the CASINDO programme supports the MHP pilot, since CASINDO strengthens the energy management capacity of the governments at subnational level.

Selected villages are responsible for managing the block grant and for the implementation of the micro-hydro projects. TSU provides supervision and technical support for the implementation and subsequent operation and management. The combination of providing funding and technical support through a community development approach, as well as capacity development at national level is crucial to a sustainable implementation and expansion of rural electrification through micro-hydro power generation.

2.3.3 SUPPORT TO GEOTHERMAL ENERGY GENERATION

By 2008, Indonesia produced some 118.0 billion kilowatt-hours (BkWh) of electricity, of which 88.1% generated by fossil fuels (conventional thermal sources), 9.1% from hydroelectric sources and 2.8% from geothermal and other renewable sources. The percentage generated from conventional sources (in particular coal) and hydroelectric sources has increased over the last decade at the expense of the geothermal source[27]. Indonesia is a net exporter of electricity. Nevertheless, the Indonesian government has developed its "Acceleration Plans" aimed at adding 10,000 MW of electricity generation capacity during five years periods in order to attend the growing demand in general and the peak demand in particular.

Although Indonesia counts with the highest potential for geothermal generation in the world, (an estimated 27 GW)[28] the installed capacity (7 installations on Java, Sulawesi and Sumatra) exploit some 3.8 % only (1,052 MW by 2009). Indonesia lags the Philippines in developing its geothermal potential, where -according to the World Bank- 27% of electricity generation is derived from geothermal resources. Indonesia is now positioning itself for an acceleration of geothermal electricity generation and the December 2008 energy investment programme of Government envisaged an increase of 4,733 MW from geothermal resources (about 48% of the planned 10,000 MW increase over the period 2009-2014). In practice however, no significant new investment in geothermal energy has materialized since 1995. For the installation of the 4,733 MW capital investment of USD 12 billion is required, of which about 70% is supposed to come from independent private sector companies (Independent Power Producers - IPPs). Geothermal energy will be used for the expansion of the grid, primarily in Java, Sumatra and Sulawesi. The national electricity distribution company PLN counts with detailed grid-roll out plans.

By late 2010, there existed some constraints that hamper or impede investment by private companies, be it national or international ones. Among these constraints figure:

- the feed-in tariff paid by a monopsony electricity buyer, being the state-owned PLN (PLN is the sole responsible for the transmission and distribution of electricity);
- the initial investment cost are very high. An average drill may produce steam that allows generating 5MW electricity. Hence for an average 20MW installation one requires 4 drills. Each drill costs USD 150,000 / day. One borehole of 2,500m requires 30-40 days of drilling. Per plant the drilling costs sum easily to USD 20-30 million per site.
- Geothermal energy was previously the responsibility of the Ministry for Coal and Mining and has now been brought under New Renewable Energy and Geothermal law

27 Ministry of Energy and Mineral Resources (2009). 2009. Handbook of Energy & Economic Statistics of Indonesia. Center for Data and Information on Energy and Mineral Resources. (revised edition)
28 Dr.Antonie de Wilde (2009). Accelerating Geothermal Development in Indonesia. Briefing note 2009.

2003, which shifted the responsibility to the Provincial Governments. These governments do not apply all the same regulations. Indonesia has not (yet) fully developed its regulations and legal guarantees regarding geothermal energy exploitation.

By September 2010, 4 out of the 9 programmes and projects in the area of renewable energy in Indonesia funded by PREP funds dealt with geothermal energy. All these activities are intended to improve the enabling environment for geothermal energy generation. These four activities are:

i. Indonesia Geothermal Power Preparation Grant (Pertamina) (World Bank);
The Netherlands made initially € 1.95 million available (with an option for an additional € 8 million) for the social and environmental impact studies related to three geothermal fields (by the Pertamina Geothermal Energy -PGE), as well as for institutional capacity building in PGE concerning geothermal energy.

ii. Indonesia Geothermal capacity building (Ministry of Energy and Natural Resources)(World Bank/GEF, funded through ASTAE);
The World Bank/GEF elaborated a proposal for geothermal energy of € 4.0 mln to provide a start for the geothermal programme. The embassy of the Netherlands allocates additional funding through ASTAE.

iii. Programme contracted out by the Netherlands embassy to AgencyNL, concerning activities related to geothermal capacity building, energy efficiency and private sector promotion. The geothermal energy package is implemented through BAPPENAS. The package provides permanent technical assistance by an advisor and a small trust fund for short term expertise. Other activities focus on regulatory and pricing policies, as well as support to the public sector (Bappenas, Ministry of Energy Mineral Resources) for private sector involvement (IFC).

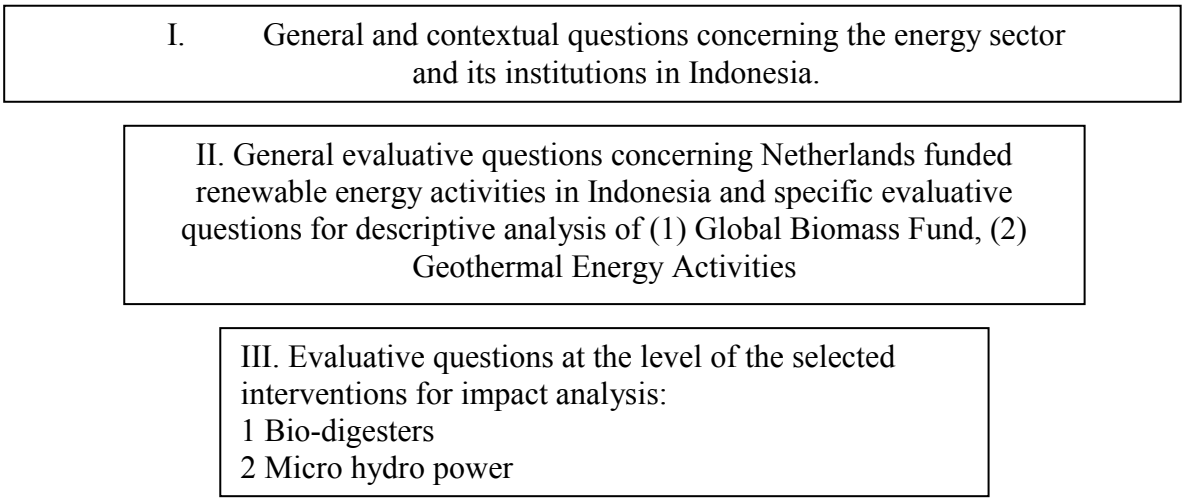
iv. IFC Indonesia Renewable Energy Programme Development (IFC);
An amount of € 0.5 mln has been contracted as contribution to a Trust Fund (Netherlands together with Finland and Clean Energy Fund) for private sector development in renewable energy[29]). The Dutch funding goes to support the national government for geothermal energy policy: (i) engaging with local governments, which have the exploitation rights of geothermal fields, and (ii) assist with tendering. In addition, IFC develops show case projects regarding biomass, biogas and new innovations such as hybrid technologies. A major working element is the pricing policy, since at present the price for geothermal and biomass is set too low (in the view of the IFC). The main role of IFC is capacity development and financial engineering.

29 Note: the Arrangement dated 23rd Nov 2009 refers to the IFC Indonesia Renewable Energy Program that comprises 4 interrelated components. The Netherlands' contribution is earmarked for 2 out of those 4 components, being (1) the promotion of sustainable regulatory and pricing policies and (2) advise on preparation of geothermal and hydro projects, with the aim to involve private sector in the provision of renewable energy. Thereto the ministry and regions will be strengthened in the capacity to design well-structured and competitive tenders.

3 EVALUATION QUESTIONS

The overarching evaluative question is mentioned in 1.1. The specific evaluation questions vary according to the level of analysis and the type of energy intervention. These questions can be grouped into three clusters:

I: General and contextual questions concerning the energy sector and its institutions in Indonesia.
II. General evaluative questions concerning the Netherlands funded renewable energy activities in Indonesia and specific evaluative questions for descriptive analysis of (1) Global Biomass Fund, (2) Geothermal Energy Activities.
III. Specific questions concerning the impact of selected programmes / projects in Indonesia.



3.1 GENERAL AND CONTEXTUAL QUESTIONS CONCERNING THE ENERGY SECTOR AND ITS INSTITUTIONS IN INDONESIA

The energy programmes and activities in Indonesia are influenced by and embedded in a policy and institutional environment. Government applies an active policy to provide access to energy to its population and in addition its policy is aiming at doing so increasingly by non fossil fuel energy sources, like geothermal energy and hydro energy. In practice however, the same government policies have not been very conducive to strong private sector investment in the renewable energy sector. The evaluation will pay attention to the role of the government in facilitating different interventions in the energy sector and in providing an enabling environment to initiatives in the area of renewable energy generation.

Problems and context:

- What are the key problems in the energy sector in Indonesia and to which extent are these problems gender specific?
- What are the main characteristics of the energy sector; the access to different sources of (renewable) energy? What are the main demographic, economic and environmental characteristics in relation to energy?
- What is government's main policy regarding energy in general and renewable energy in particular and how have these evolved over time?

- What are the major institutions involved in the energy sector; to which extent are these public or private institutions?
- What are the features of existing market mechanisms when it comes to provision of energy to households (fuel wood, charcoal, gas, stoves, kerosene, electricity)?

(Institutional) sustainability:

- Are the roles of the public sector institutions directly involved in (renewable) energy clearly defined and fulfilled?
- Do the institutions concerned have the required capacity for increasing and sustaining access to renewable energy for the poor in the long term?

3.2 QUESTIONS CONCERNING THE NETHERLANDS FUNDED RENEWABLE ENERGY ACTIVITIES IN INDONESIA

The inventory of renewable energy activities presented in Annex 1 is a 'snap shot' made mid 2010. It is likely that this list will change over time. Based on the activities known by mid 2012, the list will be completed. In principle, all activities known at that moment in time will be described and assessed, except for the projects funded by the Global Sustainable Biomass Fund. Out of the 9 funded activities by this Fund, two (2) projects will be described and assessed.

The evaluative description of the activities listed in Annex 1 will be based on the following questions:

Input and policy relevance:

- What are the objectives of the PREP supported programmes/projects identified in Indonesia? What was the envisaged target group for each of these programmes?
- What are the key problems addressed by the programmes/ projects supported by the Netherlands? To which extent are the key problems gender specific?
- To what extent are the Netherlands supported programmes and projects aligned to the Indonesian energy policies? To which extent are these programmes/projects relevant to the Indonesian policy on renewable energy?
- Are the energy activities supported by the Netherlands (and/or their results) strengthened or reinforced by policies, structures, systems, programmes and projects supported by government?
- Are the energy activities supported by the Netherlands (and/or their results) strengthened or reinforced by programmes and projects by other donors?
- What inputs (financial and human resources) have been provided to the programmes/projects?
- What activities/ interventions have been undertaken in practice? In what phase is the project being implemented (pilot, roll-out, scaling up)?
- What approach has been adopted in order to meet the objectives?
- Which organisations were involved (private/public) in each of these programmes/projects? Did the approach build on existing channels of implementation, using existing capacity and knowledge? If not, why not?
- Have monitoring and evaluation systems been put in place?

Output and results:

- What have been the main outputs? Have the output targets been achieved according to monitoring information? Is gender specific information on outputs available?
- According to monitoring information: how many devices were installed and how many are still in use? If they are not in use why not?
- According to monitoring information, what has been the change in the number of individuals (m/f), households, communities and/or other beneficiaries that have access to and use the energy-related products and/or services provided in the target area?

(Institutional) sustainability:

- What are the linkages between the programmes / projects and the public institutions in Indonesia?
- Was a (financially) self-sustaining market for the energy sources established and how? How sustainable are the service providers (companies)?
- Do the institutional arrangements provide for monitoring of quality of services and sustainability, and follow-up of issues derived from monitoring data?
- To which extent have the programmes / projects contributed to the fourth objective of PREP, being "developing capacity and knowledge with regards to renewable energy" in Indonesia?

3.2.1 GLOBAL SUSTAINABLE BIOMASS FUND

Within the desk studies of all Netherlands funded PREP-activities, special attention will be paid to the Global Sustainable Biomass Fund. As sample two activities have been selected for more detailed assessment:

- Sustainable Candlenut and Castor Biomass Supply Chains in Lombok Island (Fauna and Flora International)
- Sugar palms for sustainable biomass production (SPIE Controlec Engineering BV).

Apart from the questions raised in 3.2., particular attention will be paid to:

- To which extent are the activities developed relevant to (i) the energy problems identified in the communities covered by the project; (ii) relevant to the overall objectives of PREP and (iii) relevant to the specific objectives of the Global Sustainable Biomass Fund.
- According to monitoring information, how effective have these activities been in providing access to renewable energy to the local households and communities?

3.2.2. SUPPORT TO GEOTHERMAL ENERGY GENERATION

The 4 projects (2010) related to geothermal energy generation are all focused on the "upstream" aspects of the process of improving the enabling environment for private sector involvement in the exploration of geothermal energy. That implies that the activities are directed to the public sector entities and aimed at improving the performance of the private sector (and banking sector) with the ultimate aim to attract (new) investors to the geothermal energy exploration.

Figure 1 shows the results chain, but within the time frame given, what could and should be assessed are the outputs and outcome only. Given the time requirements it is unlikely that private sector companies would count with installed capacity by 2012. At the best they may

have started their investments by 2012. The evaluation of the geothermal energy generation will address questions at output and outcome level related to the following aspects:

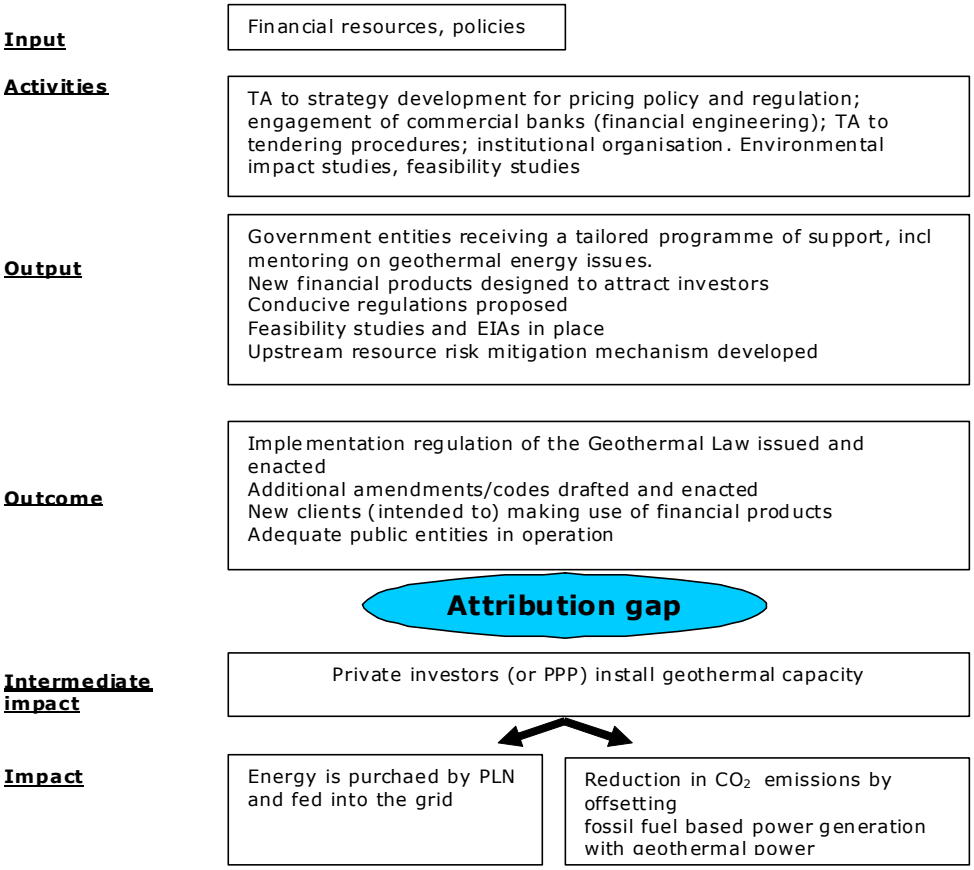
Output and results

- Which –and how many- government entities received tailor made technical assistance in the area of price policy and formulation of regulations in the area of geothermal energy generation?
- What kind of new financial products were developed, in particular those related to risk mitigation?
- Which and how many feasibility studies were facilitated or conducted and how many Environmental Impact Assessments (EIA) implemented?
- Where the proposed and drafted regulations related to the Geothermal Law approved and enacted?
- Where there any additional regulations or codes developed and enacted in the area of the exploration licenses?
- Which and how many private enterprises made use of the financial instruments developed?
- What kind of public-private arrangements have been put in place?
- How many new (potential) investors have been attracted or have shown interest in the geothermal energy generation sector?

Intermediate impact

- Are there any private sector companies, both national and international that have started to make investments, either individually or in public-private partnership in geothermal energy generation? If positive, can this investment either in total or in part being attributed to the improvements in pricing policy, regulations and codes?

Figure 1: Support to geothermal energy generation results chain



3.3 QUESTIONS AT THE LEVEL OF THE INTERVENTIONS SELECTED FOR RIGOROUS IMPACT EVALUATION

IOB selected two interventions for rigorous impact evaluation: (i) the Indonesia Domestic Biogas Programme, (ii) the micro hydro energy programme. Apart from the evaluative questions described in 3.2, for these activities the following specific questions should be addressed as well:

Programme input:

- What attempts have been made to target and include women at all stages in the programme/project cycle?
- What are the financing mechanisms for the programme/project and does this include measures to ensure equity in access to energy (e.g. access to credit for women)?

Programme efficiency:

- Have specific measures been undertaken to enhance efficiency? If so, how and what have been the results?

- What have been the total (development and recurrent) costs and the costs per main output and beneficiary? To what extent are costs covered by contributions of the users/consumers? (as far applicable)
- How cost-effective is the intervention, taking into consideration the financial inputs in terms of equipment, personnel, technical assistance as compared to the access to energy provided expressed by the number of households or beneficiaries ("value-for-money"). What benchmark can be used? (as far as applicable)

Programme effectiveness:

- What has been the change in the production and consumption of the energy source concerned?
- Has there been a shift from non-renewable to renewable energy sources?
- Has the activity had an effect on reduction of CO_2 emissions?
- How are benefits distributed among households in different income groups? Has the activity had an effect on gender equity in access to, use of and benefits from energy sources? (as far as applicable)
- What positive and/ or negative unintended effects occurred?

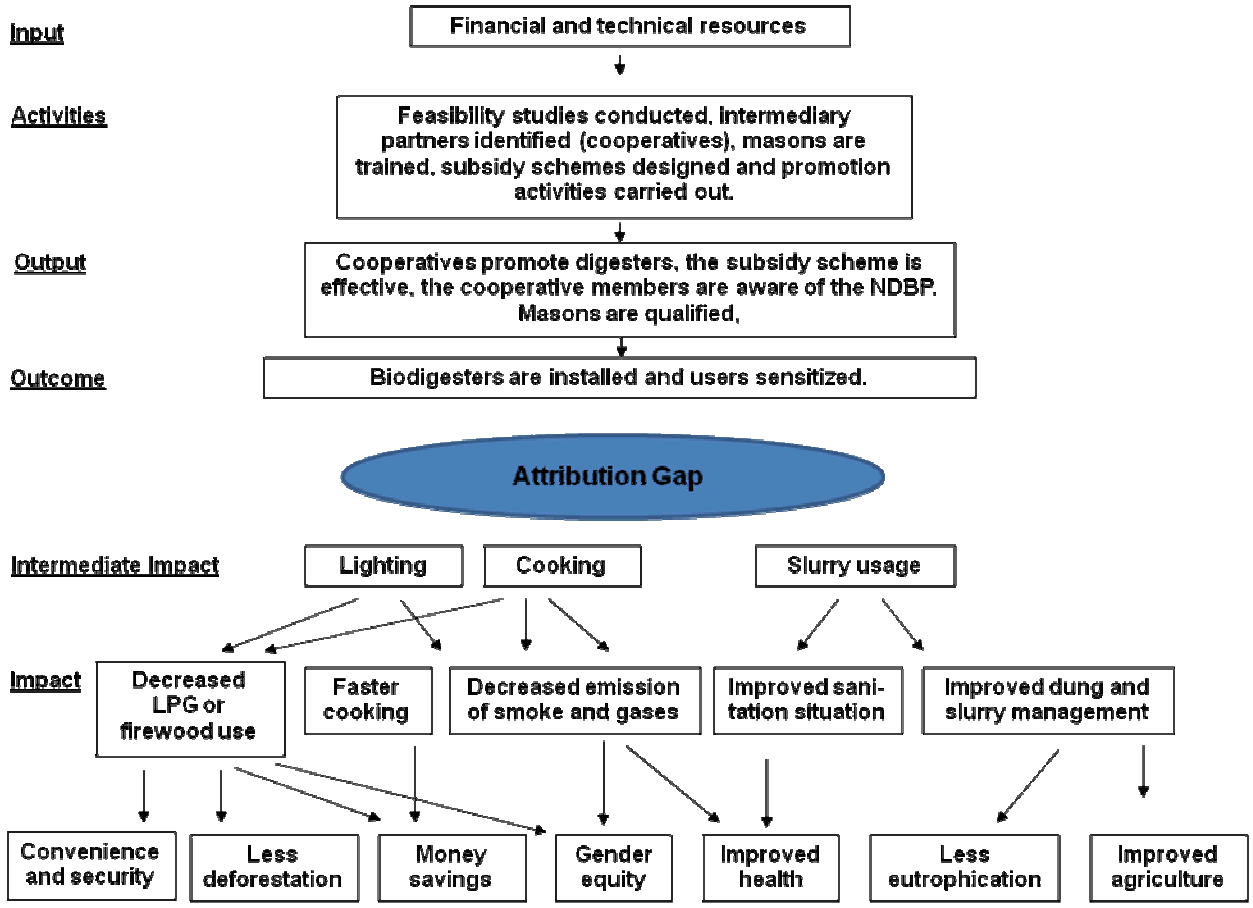
These questions are further detailed on the basis of the results chain for the individual interventions.

3.3.1 INDONESIA DOMESTIC BIOGAS PROGRAMME (BIRU)

The target group of the programme consists of comparatively rich households. According to a first baseline study contracted by HIVOS[30] about 90 % of the households that obtained a digester did have access to modern cooking energy like LPG or kerosene. These households used firewood as well, mainly since the firewood is easy to obtain. Having this in mind, the expected impacts of the intervention are health effects, savings in cash outlay (in case LPG is displaced), convenience (the biogas is directly "delivered" to the kitchen through a pipe), higher security (occasionally, LPG causes explosions mainly due to inadequate connections), but the effect on deforestation will largely depend on the geographical area (the human pressure on the forest varies enormously). Time savings as a result of easier access to energy resources may be expected to be quite low. In addition, a digester implies the use of dung that –in the form of slurry- can be applied as fertilizer. Presently, some farmers use dung straight away as fertilizer, others do not use it at all. In both cases, it flows –in part or its residuals- into the subsoil and groundwater and/or into natural streams and may imply both environmental and health hazards. By contrast, the biogas digester produces slurry as a by-product that is a more efficient fertilizer than dung, while at least some of the health risks diminish. The use of biogas digesters reduces –in potential- the environmental risks.

30 JRI Research. Socio-economic and gender baseline study for the IDBP, July 2010.

Figure 2: BIRU biogas results chain



The evaluation of the bio digester programme will address questions related to the following aspects:

Output and results

- Which socio-economic groups applied for a digester?
- Did the household make use of the credit schemes or other loans to obtain a digester? What percentage of the total investment cost was financed?
- Were users properly informed about how to use the digester (e.g. plant initial feeding, presence of user manual)?
- How many of the applicants (or actual biogas users) were using LPG, kerosene, electricity or firewood prior to the intervention?
- As compared to the applications, which socio-economic groups obtained digesters?
- Who (gender specific) in the household has made the decision to buy the biodigester?
- How reliable is the gas supply?
- How many digesters have been installed and how many are being used?

Impacts:

- To what extent have installed biogas plants actually been used (gas production)? If not, why?

- Which expenditures does the household reduce in order to finance the investment into the digester?
- For what purposes is biogas used (cooking, lighting, other)?
- What is the relative share of the various sources of energy for cooking and lighting? (biogas, LPG, kerosene, electricity, candles, charcoal, firewood, others)?
- To what extent are traditional stoves still used?
- How much is saved in total (per week or month) on 'traditional' energy sources (LPG, kerosene, firewood, candles)? How have expenditures for energy changed over time?
- How have cooking and lighting habits changed due to the use of biogas?
- Has there been any change in time/ workload, disaggregated by gender?
- For what purposes is the time saved been used, disaggregated by gender?
- To what extent did indoor air pollution reduce (perception of users only)?
- To what extent did health conditions (in particular respiratory illnesses) change, specifically among women and children?
- Does the household use the slurry as fertilizer? How did the households use/dispose the dung before the intervention?
- What is the effect of digester slurry on agriculture (use and sale of fertilizer, expenditure on fertilizer, frequency of manure collection, crop yields)?
- To what extent has comfort/convenience changed, disaggregated by gender? What monetary value do households attribute to this increased convenience?
- To what extent do activities during evening hours change due to improved lighting usage? Have study hours/ reading time of children changed?
- Have additional jobs been created in the biogas business sector (contractors, masons, input supply), disaggregated by gender?
- Has the availability of biogas triggered new economic activities or displaced old ones?
- What (if any) are the un-intended or negative impacts?
- Are there more or less accidents (explosions etc.) compared to LPG usage?

Sustainability

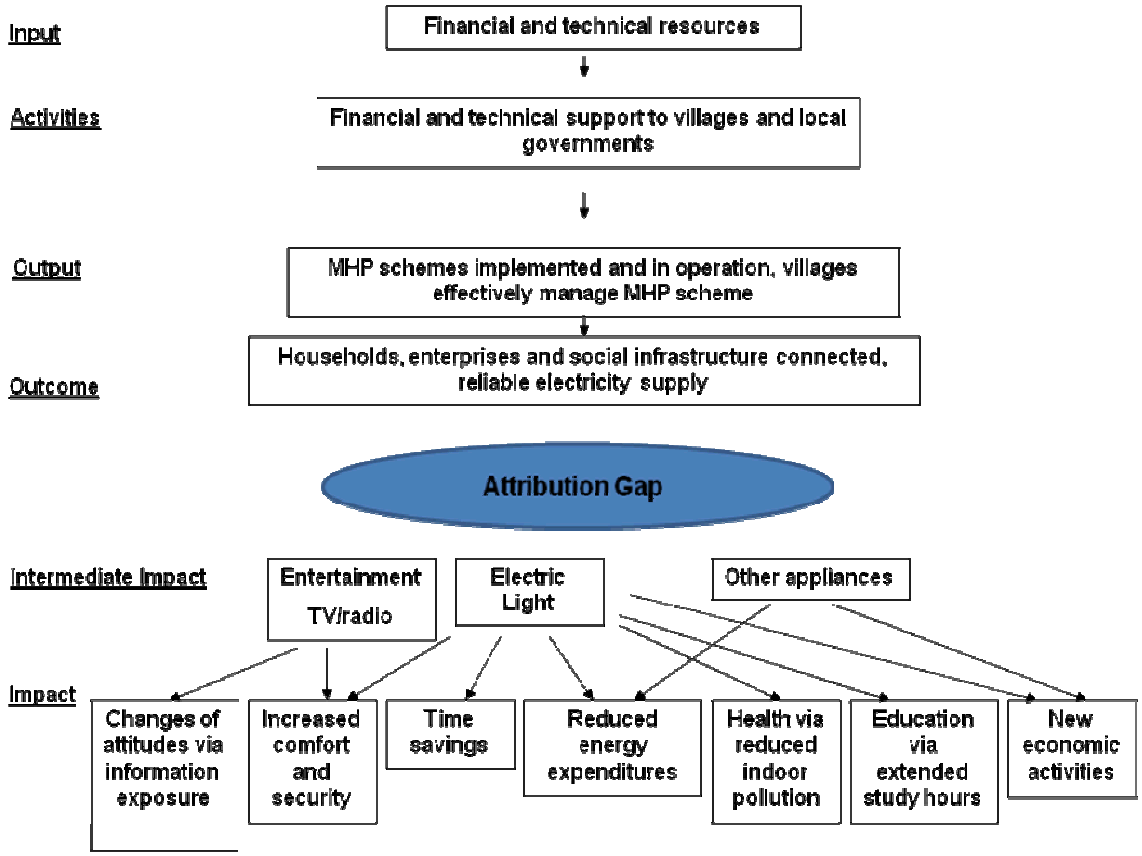
- Notwithstanding the short experience with the HIVOS-SNV biogas installations, what observations can be made about the technical sustainability of the equipment, for example when it comes to availability of materials for repairs, special cooking and lighting equipment?
- What is the financial sustainability of the BIRU programme from a) the perspective of the biogas client; b) from the perspective of the mason and small construction enterprises that install and maintain the biogas installations and c) from the perspective of a public sector support programme as far as it concerns the incentives, the advertisement and other dissemination activities.
- To which extent the biogas installations affect –positively or negatively- the environmental sustainability?

3.3.2. MICRO-HYDRO POWER

The intended outcome of the micro hydro programme is to supply electricity to rural households, enterprises and social infrastructure. The MHP pilot program targets villages that are not connected to the grid and that rely on traditional sources of energy. From the programme's perspective, the main intended impacts are on educational and health level as

well as on the level of poverty reduction. The provision of electricity is supposed to contribute to the opportunities for income generation; to allow for better studying conditions and to improve the quality of health services. In addition, indoor air pollution from traditional lighting sources is expected to reduce. Improved lighting services augment convenience, comfort and security. Not least, radio and TV increase convenience and provide information.

Figure 3: Green PNPM MHP pilot program results chain



The evaluation of the MHP pilot will address questions related to the following aspects:

Output and results:

- How do villages decide to apply for a micro hydro scheme, and who (gender specific) was involved in the decision?
- Which socio-economic groups (incl. poor/non-poor) applied for connection?
- What is the connectivity rate of households, enterprises and social infrastructure institutions in the area studies?
- How many households have been using electricity (either generated by an engine, solar energy or by an other source) prior to the MHP electricity became available?
- How reliable is the electricity supply of the micro hydro plant (frequency of outages)?
- What are the main appliances using electricity used by households, enterprises and social infrastructure institutions? How many hours per day or week is electricity being used?
- For what purpose and by whom in the household is electricity being used?

Impacts:

- What is the change in expenditure (per time interval) between the energy sources used prior to the arrival of electricity from the micro hydro plant (candles, kerosene, batteries) and current expenditures?
- To what extent has (the perception of) safety/protection changed?
- To what extent has comfort/convenience changed, disaggregated by gender? What monetary value do households attribute to this increased convenience?
- Has there been any change in time/ workload, disaggregated by gender?
- For what purposes is the time saved been used, disaggregated by gender?
- To what extent have the household's activities during evening hours changed? Have study hours/reading time of children changed? Do women (and children) enjoy more or less rest for physical recuperation?
- To what extent has indoor air pollution been reduced (according to the perception of dwellers)?
- To what extent have health conditions (in particular respiratory illnesses) changed, specifically among women and children?
- How have, in response to the possibly increased media exposure, attitudes and behaviours, such as women's status, fertility, children's school enrolment changed?
- How are these impacts distributed across different household members (women vs. men, children vs. adults)?
- Has the enrolment and school attendance, as well as student performance changed as a result of use electricity in the school?
- Has the availability of electricity triggered new economic activities or displaced old ones?
- What (if any) are the un-intended or negative impacts?

Sustainability

- What observations can be made about the technical sustainability of the electricity generation equipment, for example when it comes to availability of spare parts or technical expertise for repairs of the generation and electricity materials at household level?
- What is the financial sustainability of the MHP programme from a) the perspective of the electricity user; b) from the perspective of the small construction enterprises that install and maintain the installations and c) from the perspective of the public sector support programme as far as it concerns scaling down of currently provided incentives and subsidies.
- To which extent the MHP installations affect –positively or negatively- the environmental sustainability?

4 METHODOLOGY, RESEARCH DESIGN AND DATA SOURCES

The Framework Terms of Reference for the impact evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation (October 2009) establishes methodological requirements concerning the selection of forms of energy supply subject to evaluation, such as an urban / rural mix and research techniques to be applied. For the evaluation of the activities in Indonesia a mixture of quantitative and qualitative methods will be used.

Quantitative techniques will be used in two studies (biogas and micro hydro energy generation) to measure the relationship between intervention and effect variables, and how much each of the interventions contributed to the effects, while controlling for other factors that might have an impact on the selected effect variables.[31] Depending on the scope of the interventions and the quality of data, existing statistical data such as household surveys, demographic and health surveys and administrative data will be used next to own base line surveys.[32] Quantitative research methods will also be used for the measurement of sustainability aspects at the level of the energy users. The quantitative techniques for both studies will rely on interviews using a structured questionnaire covering socio-economic aspects of household life. This includes housing conditions, education, agricultural and non-agricultural revenues, assets, energy consumption, gender and health issues. In the biogas interventions the focus will be on cooking behaviour and lighting, while for the micro hydro energy the use of lighting and small electric devices will be particularly addressed. In these two studies the quantitative techniques will be supplemented with qualitative techniques like focus group discussions and interviews with key informants, such as village chiefs, beneficiaries or local NGO representatives.

The qualitative methods will be used for the contextual analysis, the descriptive components of each programme / project funded with PREP resources, the (institutional) sustainability analysis as well as in the evaluations of the geothermal components and the two activities funded by the Global Biomass Fund. Qualitative methods are also indispensable to capture potentially unintended impacts (for example in testing the questionnaires for surveys). Qualitative methods will comprise desk research on secondary sources (inputs and outputs), in particular literature study and documentation; interviews with project/programme staff and other stakeholders.

4.1 METHODOLOGY FOR THE GENERAL AND CONTEXTUAL QUESTIONS CONCERNING THE ENERGY SECTOR AND ITS INSTITUTIONS IN INDONESIA

The general and contextual questions concerning the energy sector and its institutions in Indonesia will be addressed using qualitative techniques. Basic information has been gathered in preparation to and during the field mission in October 2010.
Further description and analysis will be based on desk research by means of documentation, web search and semi-structured interviews (mainly in the Netherlands) with the responsible stakeholders for the various PREP components. In the margin of missions for the impact evaluation interviews with key informants will provide supplementary information. These missions can be used for verification purposes as well (see next section).

[31] Including addressing, where necessary and not dealt with by comparing over time, selection biases in case beneficiaries of energy programmes/projects have not been selected at random (e.g. for biogas, participants need at least to have cattle).
[32] Energy indicators do not usually feature in these standard household surveys. However, this data might be useful for identifying samples and complementing the surveys undertaken for this evaluation.

4.2 METHODOLOGY FOR EVALUATIVE QUESTIONS CONCERNING ALL NETHERLANDS FUNDED RENEWABLE ENERGY ACTIVITIES IN INDONESIA, INCLUDING QUESTIONS ON SUSTAINABILITY

The evaluative questions concerning all Netherlands funded energy activities in Indonesia will be addressed mainly on the basis of a review of programme and project documentation, in particular design documents, progress and monitoring reports and –if available- evaluation reports. Basic information has been gathered in preparation to and during the field mission in October 2010, but will be updated from mid 2012 onwards. This will encompass file research at the offices of most implementing agencies (GIZ, SNV, HIVOS, AgencyNL and the World Bank). Further description and analysis will be based on web search and interviews with key informants both in the Netherlands and in Indonesia. The sequencing of inputs and outputs will be highlighted in short intervention histories. A separate two-three week mission will be held in 2012 to verify the findings based on desk research concerning sustainability aspects and to follow up on relevant questions that emerge from the desk review.

4.3 METHODOLOGY FOR THE INTERVENTIONS SELECTED FOR IN-DEPTH EVALUATION

In the following, the evaluation approaches for the selected programmes will be presented.

4.3.1 INDONESIA DOMESTIC BIOGAS PROGRAMME

The research design will focus on a quantitative evaluation of impacts of biogas use at the household level. To this end, a baseline survey will be conducted by mid 2011, with a follow-up survey mid 2012. The evaluation design will be based on a difference-in-difference approach. For the baseline survey, two groups of households will be interviewed: the treatment group will be formed by households that are about to obtain a biogas digester. For the control group comparable households will be visited that are likely to get no digester. The households for both groups will be selected from the population of dairy cooperative members. As described in Section 3.3.1, the cooperatives are the pivotal intermediary in the programme's approach to disseminate the digesters and their members constitute the target group of the BIRU programme.

Since there will be a period of one year only between the baseline and the follow up survey, the challenge will be to get households for the treatment group that will obtain a biogas digester right after the baseline interview. In the case a random sampling would be applied among the cooperative members for the baseline in 2011, it is not likely that a sufficient number of these farmers would obtain a digester in the weeks after the interview. Hence, the treatment group would be too small, and that implies that the ex-post sample in 2012 would not have a sufficient number of households that will have been using a digester for a sufficient period of time. Therefore, based on information supplied by the dairy cooperatives those households that will be 'treated' soon will deliberately be selected.

At the baseline stage, households that have both applied and qualified for a digester, and that are likely to be served within the next 2-6 weeks, will be sampled for the treatment group. In addition, households that have not yet expressed their interest in a digester, but that would in principle qualify, will be sampled for the control group. In total a sample of around 1200

households is envisaged; 250-300 households for the treatment group and 400-450 households for the control group. One of the underlying considerations for having a slightly larger control group is to ensure that there are sufficient non-treated farmers by 2012. Further considerations underlying the choice for a sample size of these dimensions are presented in Annex 1.

The major qualification criteria that are checked by the cooperative prior to receiving a digester are the number of cows on stable, the weekly milk yield and revenue, and the land extension of the farmer. These data are available at the cooperatives, and will be used to identify comparable households without digesters from the population of cooperative members. Including these criteria in the selection of control households will assure a sufficient comparability to treatment households in many regards. Regarding expenditure for energy, this approach should be able to remove distortions due to a difference in relevant yet unobserved characteristics between digester obtainers (treatment group) and non-obtainers (control group).

Yet, some of these unobservable differences may remain and may cause biases, given that they also affect outcome variables. One might, for example, think of fear of LPG explosions as a driving force. Those households that are more afraid of accidents are more inclined to obtain a biogas digester. At the same time, more accentuated fears also affect convenience and perceived security. This might lead to different responses between treatment and control group, which are not attributable to the treatment, but could be falsely interpreted as such. The difference-in-difference approach will account for these unobservable differences between treated and control farmers (like more accentuated fears), as long as one can assume these to be fixed over time. The difference-in-difference approach also allows accounting for general environmental changes in the studied regions as long as these changes affect the control and the treatment group in the same way.

Nevertheless, in some of the project's target regions there are dairy cooperatives with which the programme is not working yet. The options to recruit the control group from these cooperatives will be explored. The chance of distorting effects can be further reduced, since members of these cooperatives do not have the chance to self-select into the biogas treatment.

The sample size will be around 700 households, to be visited in 2011 and 2012. The survey regions will be determined in accordance to the programme activities. The main research tool will be a structured household questionnaire covering the socio-economic dimensions of household life. Emphasis will be put on cooking energy, dung usage, and general expenditures. In addition, complementary qualitative information will be gathered through interviews with key informants and by means of focus group discussions. These focus group discussions will be organised in order to obtain local contextual information and identify potential impacts unknown to the researchers, as well as to test the completeness and appropriateness of the questionnaire.

Since in a considerable number of cases the digester obtaining households only replace LPG, which already is a clean and efficient cooking fuel, softer dimensions of benefits will be taken into account. For example, some households seem to prefer biogas to LPG for security reasons: unlike biogas, LPG is frequently associated with risks due to explosions. Furthermore, households have preferences for biogas because it offers a permanent supply directly to the kitchen. LPG, in contrast, has to be supplied in bottles. In addition to the direct

cost savings thanks to LPG replacement this might induce a certain willingness to pay for convenience reasons.

A potential risk to the evaluation approach arises from the fact that the dissemination of digesters will be more slowly than currently expected. If too few digesters are about to be installed in the baseline period, we will not have the opportunity to select a sufficient number of treatment households using the above described selection procedure. However, digester dissemination in the target regions on Java seems to be clearly increasing. The cooperatives are well organized and eager to continue the promotion activities. At the same time, the households that already have obtained a digester appear to be very satisfied and there seem to be more new customers than can be served.

4.3.2 MICRO HYDRO POWER GENERATION AND DISTRIBUTION

The MHP pilot will be evaluated through comparison with a control group before and after implementation of the plants. The objective of the study will be to assess the effects of energy generated by micro-hydro plants on various aspects of household welfare and productive activities within (farm) households as well as small scale enterprise. The study will evaluate the effect of the combined package offered under the pilot programme; this is the allocation and implementation of micro-hydro projects and the technical support offered by GIZ and TSU under the EnDev2 programme.

GIZ has implemented a baseline survey between September and November 2010 and envisages doing an ex-post survey in the future. As IOB and GIZ share common research and policy questions regarding the impact of micro hydro projects, the envisaged IOB evaluation will be conducted in close cooperation with GIZ. Apart from efficiency motives, the knowledge and expertise gathered by TSU, and its role in the selection and implementation process, makes GIZ a highly appreciated research partner. Cooperation is beneficial to GIZ as well, as pooling resources with IOB may increase the methodological rigor.

The IOB evaluation will focus on the 8 provinces in Sulawesi and Sumatra where the MHP pilot operates. The GIZ baseline study has sampled 400 households in 20 villages with an EnDev1 micro hydro power plant in operation, and 400 households in 20 MHP pilot villages, where micro-hydro plants are planned. In Sulawesi most of the micro-hydro plants in the 10 surveyed MHP pilot villages are already under construction, and are expected to be completed between early and mid 2011 In Sumatra the 10 surveyed MHP pilot villages have only applied for a micro-hydro plant. It is expected that 6 out of these 10 villages will have a micro-hydro scheme installed by mid 2011, with the remaining 4 presumably following end 2011 to early 2012.

The evaluation will build on the GIZ baseline survey and consists of two components:
(i) Conducting a follow-up household surveys in 2012 with subsequent rigorous data analysis;
(ii) Elaborating on the effects of micro-hydro power schemes on productive activities.

Follow-up household survey
The same households in 40 villages as surveyed by the GIZ baseline study, conducted in November 2010 will be surveyed in a follow-up survey to be conducted in the period

September-November in 2012. The second survey will most likely observe all sites in operation (see table 2).[33] By the time of the follow-up survey, the MHP pilot Sulawesi sites will be operational, partly for almost two years and about half of the Sumatra sites can be expected to having been connected for more than one year.

Table 2: Sampled groups

	EnDev 1 Sulawesi and Sumatra	MHP pilot Sulawesi	MHP pilot Sumatra
2010	20 villages treated	10 villages untreated	10 villages untreated
2011	20 villages treated	10 villages treated	6 villages treated 4 villages untreated
2012	20 villages treated	10 villages treated	10 villages treated

The impact evaluation will be based on a before-after and difference-in-differences analysis where changes in MHP pilot *treatment* villages are compared to changes in EnDev 1 *control* villages. For the treatment group a non-electrified status is observed in the baseline survey and an electrified status in 2011 and 2012 (i.e. a transition from "non-treated" to "treated"). For the control group (the EnDev 1 villages) electrified households are observed in all survey "waves". Compared to ordinary difference-in-difference approaches this is a particularity: The control group is already treated. The main assumption underlying such a strategy is that the trend observed for the control group adequately reflects the expected trend for the treatment group in case these would not obtain a micro-hydro plant. Since the EnDev 1 villages had already been treated a few years prior to the baseline, this is a stronger assumption than with a conventional difference-in-differences evaluation design: One might suspect that the trend changes after electrification. For example, income might increase faster once the village is electrified. This would violate the assumption, which claims that the annual change in income some years after electrification is the same as it had been before.

Nevertheless, the electrified control villages will help to difference out strong changes in the general environment, for example related to economic growth or changing prices of (traditional) fuels. In addition, effort will be put in scrutinizing the above mentioned assumption by qualitative checks on the ground[34].

There are two main sources of potential bias at the village level, induced by the MHP pilot design, which need to be considered:

(i) Self selection, as villages submit proposals to the Green PNPM programme for micro-hydro power schemes. This self selection is partly influenced by information dissemination activities of the pilot programme. But to a large extent it is also driven by local initiative, entrepreneurial ability and prioritisation. These (potentially) unobserved characteristics may also directly affect earnings capacity and livelihoods, and may lead to an overestimated effect of micro-hydro power plants on socio economic outcomes.

(ii) Non-random eligibility, as the block grants for constructing micro-hydro power plants are awarded based on specific criteria, which are assessed by TSU. These

[33] If the four villages in Sumatra will not be electrified they will nonetheless be surveyed and included as a control group.

[34] Two junior researchers will be present in the regions during the survey periods.

criteria include geographic features and potential for productive use of micro-hydro power generated electricity. These characteristics may also have a direct effect on rural livelihoods, hence introducing potentially confounding factors.

Since both the treatment and control villages have been assessed and selected by TSU (or their predecessors at GIZ) according to similar selection criteria, the second source of bias (ii) is eliminated. The same applies to the potential source of bias in (i): All villages including the EnDev1 villages have applied for a micro hydro power plant and, hence, have self-selected themselves into the electrification treatment. This leaves the question why certain villages are selected or applied earlier than others. Since the reasons underlying this timing of application or selection are likely to be static characteristics, the difference-in-differences approach will deal with this. In addition, comparability of treated and controls will be improved by controlling for pre-intervention village characteristics, based on data from the 2006 and 2008 village census (Podes) and the eligibility assessment of control villages based on selection criteria by TSU. This can be done by basic regression techniques or matching pairs of treatment and control villages on common characteristics.

The second benefit of using EnDev1 villages as control group is that the follow-up survey can be used to scrutinize the sustainability of the EnDev approach. The EnDev 1 villages surveyed for the baseline had been electrified already in 2007 and 2008. Revisiting these villages in 2012 will provide an opportunity to assess the technical performance of the micro-hydro plants, but also to track the connection behaviour, usage patterns and new appliances at household level. Finally, productive activities, firm creation and electricity take up can be tracked as it develops 5 years after the initial connection (see next section).

The main potential risk to the evaluation study is a delay in roll-out and construction of micro-hydro power schemes. This could potentially lead to too few treated units for a rigorous statistical analysis. In the pilot provinces on Sulawesi it seems that progress is being made, and it is likely that sufficient schemes will be operational by 2011 and 2012. The risk of delay seems more apparent for Sumatra, where the programme is in its initial phase. However, the provinces have been selected based on their familiarity and experience with the PNPM programme, while the TSU has a vast experience with supporting implementation of MHP. Information from TSU staff in Sumatra confirms progress for at least 6 out of 10 surveyed non-electrified villages. It is highly likely that they will have been electrified by 2012 at the latest.

Assessment of the use of electricity for productive purposes

The productive use of electricity is envisaged as one of the focal points of the MHP pilot programme. The assessment of the productive take up of electricity in the survey regions will be based on two pillars. The first pillar will be the quantitative data collected by means of the structured household questionnaire, the core of the MHP pilot baseline study (mentioned above). It extensively covered productive use issues – primarily at the level of home activities. The use of appliances and income generating activities by the households are comprehensively captured. Follow-up survey in 2012 will particularly serve to evaluate such activities. These two survey waves (2011 and 2012) will enable to observe to what extent households change their income generating activities and whether this is based on electricity, be it the use of electrical equipment or only lighting. The survey also allows examining whether this productive use occurs immediately after the arrival of electricity or that households require some time to adapt prior to moving into a productive use. The EnDev 1 villages included in the baseline will allow us to track the development of productive home

activities over time over a period of up to 5 years, since they had been electrified already in 2007/2008.

Beyond productive activities at household level, and also in addition to what the baseline data include, the second pillar of the approach concerning the productive use is on micro-enterprises. However, the baseline survey registered only a very modest take-up for productive use in those villages already electrified.[35]. A quantitative study based on a firm survey does not seem appropriate in this case, since it would require a large number of enterprises in order to end up with a sufficient number of electricity adopters in the sample. In addition, the variation in outcome indicators can be expected to be relatively small, as the electricity adopters mostly use electric lighting only and do not revolutionize their production process by electric machinery.

A qualitative case study approach will therefore explore why micro-enterprises connect or not. In-depth interviews will be conducted with selected enterprises representing different firm types. The objective of these interviews will be to understand their production process and the role electricity plays or could play.

Based on the baseline survey (and experience from other countries[36]), small enterprises can be categorized as follows:

- Firms newly established after the connection to electricity;
- "Connected winners" (existing firms that improve their performance by, for example, offering new products or production techniques for which electricity is required);
- "Connected losers" (existing firms that do connect to the grid but that do not increase production and, hence, only face higher costs without benefiting from electricity);
- Unconnected firms.

Once identified, firms pertaining to each group will be visited for in-depth interviews. Particular attention will be paid to both enabling conditions and apparent constraints faced by firms (and how these might be overcome).

For all productive activities, be it on home business or enterprise level, the qualitative analysis will enquire at which markets products are sold and if other locally produced goods are crowded out. Crowding out is an important question for assessing the net benefits generated within villages or regions. In addition, the issue of increased division of labour will be addressed as an indicator for increased productivity of the local economy as a whole. For example, the availability of electricity makes an entrepreneur invest into a saw mill to supply cut timber to carpenters in the village that originally did this individually themselves. While this new product would crowd out local work and, hence, does not create additional value

35 Although the focus of the baseline study was on households, the additional information collected on village level also addressed questions concerning micro-enterprises and whether electricity is used for productive purposes. It has to be noted in this regard that in most EnDev 1 villages the micro-hydro turbine is mostly running after nightfall only. The lack of productive demand is one reason for not running it during daytime.
36 See Peters, J., Vance, C. and Harsdorff, M. (2011), Grid Extension in Rural Benin – Micro-Manufacturers and the Electrification Trap. World Development (forthcoming) and Neelsen, S. and J. Peters (2010), Electricity Usage in Micro-Enterprises – Evidence from Lake Victoria, Uganda, Energy for Sustainable Development. (forthcoming).

added as such, it can be reasonably expected to increase the productivity and thereby growth prospects of the whole village. Another example for such an increase in overall productivity is the usage of electric mills that substantially facilitate the processing of agricultural products, which could occasionally be observed in the surveyed villages during the baseline study.

4.3.3 SUPPORT TO GEOTHERMAL ENERGY GENERATION

The evaluation will not assess in detail the individual interventions, but will focus on the outcome that may be expected from this kind of interventions. Thereto pre-determined outcome indicators will be elaborated, in part based on the existing indicator set in use by the IFC (for example, the number of new regulations, amendments and codes drafted at national and sub-national level that can be attributed to the support programmes; the number of PPAs in geothermal energy; the foreign direct investment in geothermal activities). These indicators will be used to assess the effectiveness, making use of qualitative techniques only. Desk research (file and document research) as well as series of semi-structured interviews with the main stakeholders (both public sector, banks and private companies) will be made during a two week field visit in 2013. The precise evaluation method has to be determined at a later stage in coordination with the World Bank and IFC staff responsible for monitoring an evaluation in Indonesia.

5 ORGANISATION

The evaluation will be conducted by the Policy and Operations Evaluation Department of the Netherlands' Ministry of Foreign Affairs (IOB) in close collaboration with the national authorities and implementing agencies. IOB has contracted the services of the Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI) in association with the International Institute of Social Studies (ISS) to conduct the quantitative impact evaluations. Communication mechanisms will be established with the Ministry of Energy and Mineral Resources and in particular the Directorate of New Renewable Energy and Energy Conservation for a direct involvement in the main components of the evaluation.

Overall supervision for the evaluation rests with Rita Tesselaar, inspector IOB, assisted by Willem Cornelissen (consultant) and an IOB junior researcher, Jolijn Engelbertink. On behalf of RWI and ISS, the first responsible for the evaluations in Indonesia is Robert Sparrow. He is throughout the process of the evaluation supported by Jörg Peters and other members of the research team. Contacts with local partners and the survey implementation will be handled by Jörg Peters and Robert Sparrow.

Both the "General and contextual description and analysis concerning the energy sector and its institutions in Indonesia" and the "Description of the Netherlands funded renewable energy activities in Indonesia" will be conducted by IOB. Since most of this work is to be conducted in 2012 and 2013, the precise tasks in relation to available IOB manpower have to be determined at that time.

The quantitative impact evaluations of the national biogas programme (BIRU) and the micro hydro electricity programme will be the responsibility of RWI and ISS. A substantial involvement of national researchers is envisaged, both in the design of the questionnaires, the

data collection in the field and in the first data processing. RWI and ISS are responsible for the reporting to the IOB in such a way that the report constitutes an integral chapter for the final evaluation report.
The evaluations of the geothermal activities and the two activities funded by the Global Biomass Fund will be conducted by either IOB staff and/or an external consultant, supported by an IOB research assistant. This is to be determined in 2012.

IOB is responsible for review and preparation of both the final report ("Impact evaluation of renewable energy in Indonesia"; spring 2014) and the chapter extracted from that report that will be used as component of the report concerning the evaluation of the PREP ("Evaluation of the Promoting Renewable Energy Programme", summer 2014). The exact staff input at this stage is to be determined.

The draft final (country) report will be presented for comments to the pertinent authorities in Indonesia, to the embassy of the Kingdom of the Netherlands in Jakarta, to the department responsible for renewable energy in the Netherlands' ministry of Foreign Affairs, to the implementing agencies of the programmes and projects involved and to the Reference Group. The Reference Group has been strengthened with the Indonesian expert Dr. Fabby Tumiwa as well as Dr. Dadan Kusdiana from the Ministry of Energy and Mineral Resources. The draft report will be commented on by two IOB evaluators/ co-readers.

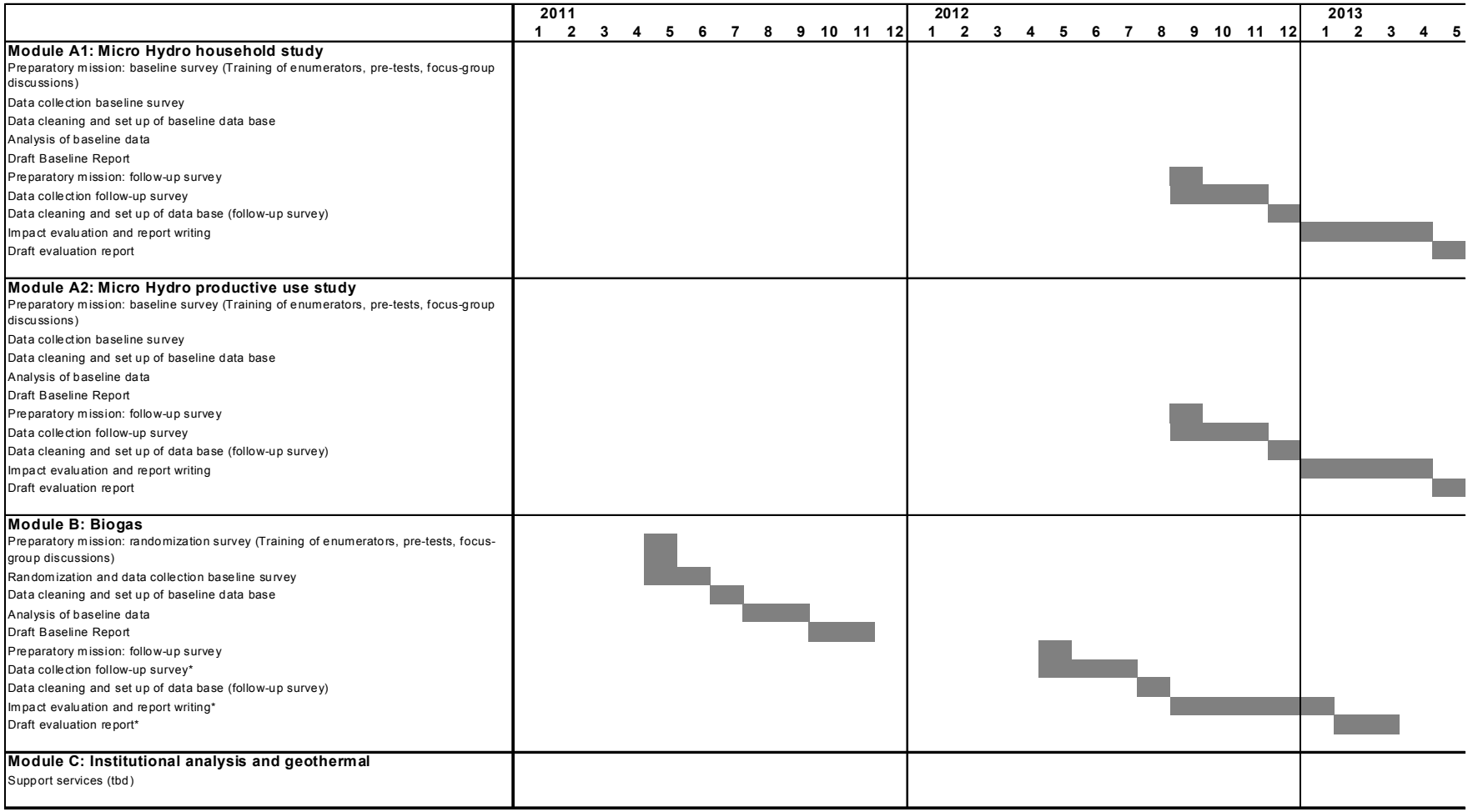
5.1 TIMING

The timing of the elaboration of the contextual and institutional analysis as well as the inventory and descriptive evaluation of all activities funded with PREP resources in Indonesia is an ongoing process that may experience changes over time, if and when new programmes or projects funded by PREP resources may either start or discontinue in Indonesia. In any case, it will have to be completed not later than the last quarter of 2012.

The timing of the impact evaluations in Indonesia is -in part- determined by the seasons. The baseline and repeat surveys for the biogas component will be conducted between May and July in 2011 and 2012. The survey on the micro hydro project will be done between September and October 2012. The study of the output and outcome of the support to the geothermal energy generation is yet to be determined (and coordinated with World Bank and IFC), but will in principle be conducted during the last quarter of 2012 or first quarter 2013.

A tentative overview is provided in the following table:

Time-line-graph for Indonesia study



6 EXPECTED DELIVERABLES

The studies and evaluations mentioned in this ToR will produce the following deliverables (in the English language):

November 2011
A working document detailing the methodology applied and the first results obtained from the baseline survey on the (future) **biogas** beneficiaries.

March 2013
Draft chapter detailing the results obtained from the impact analysis of the **biogas** activities.

Draft section detailing the analysis of the activities supporting the **geothermal** energy generation.

May – June 2013
Draft chapter detailing the results obtained from the impact analysis of the **micro hydro** activities.

October 2013:
A draft final report at country level integrating the chapters mentioned above. The draft final report will be in English. This report will be published as 'stand alone' IOB report.

In 2014, a synthesis and policy evaluation report concerning the energy and development cooperation policy of the Netherlands will include the information derived from the Indonesia study. This final product does not pertain to the present ToR.

Annex 1: Quantitative Analysis Indonesia Domestic Biogas Programme; Considerations for sample size

For the Indonesia Domestic Biogas Programme a total sample of around 700 households is envisaged; 250-300 households for the treatment group and 400-450 households for the control group. The considerations underlying these numbers are presented in the following.

First, the two decisive parameters of power analysis provide an indication of the number of households required to identify a possible impact:

(i) Heterogeneity of biogas obtainers: Although the surveyed households that are expected to take-up biogas are all dairy farmers, they are likely to be heterogeneous with regard to a crucial characteristic, namely used cooking fuels. The BIRU baseline and field trips conducted during the preparatory mission have shown that some of the biogas users have used LPG before, while others relied on kerosene or firewood. In addition, many farmers use firewood complementarily to biogas, but with different intensities. Hence, in order to have a sufficient number of biogas obtainers in each of the emerging subgroups, there should be at least 250 or 300 households in the treatment group.

(ii) Expected size of the impacts: As the evaluation does not focus on one single impact indicator, one power analysis is not sufficient to determine the sample size. The expected impact size varies substantially between the different impact indicators. The effect that biogas usage might have on health outcomes, for example, is likely to be only observable in the long term. Changes to energy expenditures, in contrast, can be expected to be more visible immediately after the take-up of biogas. To detect impacts on health outcomes would require a much larger sample size than 700 households, which is also restricted by budget restrictions. While effects on energy expenditures could be detectable also with a few hundred households, the impact sizes for the other indicators in Figure 2 are expected to range between these two examples. This leads to the choice for a sample size of 700 in order to assure enough power to detect effects on most of the indicators – given they occur as expected.

Furthermore, while from a narrow power analysis perspective a smaller sample size for the control group could be sufficient, there are two reasons to oversample the control households in the baseline phase:

(i) “Non-compliant” control group households: Some of the households interviewed for the control group at the baseline stage decide to obtain a digester afterwards. This would lead to a smaller control group as these households would then shift to the treatment group after the follow-up survey has been conducted.

(ii) Non-comparable control group households: The selection of biogas non-obtainers for the control group is based on information available at the cooperative level (i.e. without doing a survey), mostly on the number of cows and their milk income. In analyzing the data further characteristics will be applied to improve comparability between biogas users and non-users that could not be observed before the surveys. This will prune some of the non-obtainers from the sample.

Annex 2: Renewable Energy programmes funded through the PREP in Indonesia

	Financing modality	Brief description of main activities	Current State of Affairs (October 2010)	DGIS funding in €
Activities contracted out to Agentschap NL	Implementation through Agency NL	Capacity building on national level and in 5 provinces, assisting in the implementation of regional energy plans and developing concrete energy projects (CASINDO): € 4 mln	Implementation has started mid-2009	€ 9.714.935,3
		Geothermal assistance (to Bappanas)	Expert has been seconded to Bappenas	
		Energy efficiency component		
		Private sector promotion		
Micro-Hydro Programme [Green PNPM]	Block grant provided through the World Bank	'Soft earmarked' funding to community programme focused on MHPP ('Green PNPM')	Envisaged at the end of the programme in 2013 around 300 MHPs in Sumatra and Sulawesi	€ 14.474.500
Micro Hydro Programme [Technical Support Unit]	Silent partnership between DGIS-BMZ, implemented by GIZ	Two elements consisting of: Technical Support Unit (TSU) and institutional capacity building at ministry level (MHPP²)	TSU and MHPP² are currently operating	€ 8 mln
Biogas programme	Implemented by HIVOS/SNV	The installation of bio digesters, to be used for cooking and lighting purposes for households in rural areas.	Currently around 600 digesters have been installed. 8000 are foreseen by 2012	€ 6.366.363
Geothermal programme (WB)	Funded through World Bank	Conducting feasibility studies for three geothermal fields. Possibility to scale up financing to EUR 10 mln to finance capacity building programme.	Feasibility studies in progress	€ 1.950.000 (HP in total € 10 mln)
Geothermal (WB/GEF/ASTAE)	Funded through ASTAE	ASTAE provides additional funding to the World Bank/GEF geothermal programme (capacity building and technical assistance)		USD 175.253 (ASTAE)
Palmoil certification	Implemented by CREM, Brinkmann Consultancy and Global Sustainability Associates	Palmoil certification of smallholder groups	Baseline assessments carried out in Palembang (June 2009) and Padang (January 2010).	€ 349.500
Renewable Energy programme IFC	Implemented through IFC	Provision of investment and advisory services focused on private sector development in renewable energy sector.		€ 510.000 (HP in total 1o mln)
Sustainable biomass programme	Implemented through the Embassy	Different activities following up on the Letter of Intent on Sustainable Biomass production.	LoI signed in 2007. Currently only a small portion of the amount has been used. EKN is still seeking ways to	€ 5.5 mln

			incorporate activities under one MoU.	
Global Sustainable Biomass Fund	9 supported programmes in Indonesia: two of these are involved in energy-access provision at a local level	Development and Monitoring of sustainable Candlenut and Castor Biomass Supply Chains (FFI)	Establishing certified supply chains for candlenut and castor biomass and biofuel energy production, processing and marketing at the household and rural industry level on Lombok. It involves the distribution of special Oil Stoves at household level although under the project this will not amount to more than 200 of these stoves.	Total project cost is € 1.033.000
		Sugar palm for sustainable biomass production (SPIE) in North Sulawesi	Creating sustainable energy from sugar palm biomass, for local use as well as exporting to other regions by making use of village Hubs and larger sugarpalm factories.	Total project cost sums to € 1.966.000